POLLEN COUNTING

Purpose

This Air Quality Group procedure describes the process to collect, analyze, and report the pollen concentration counts collected with the Rotorod pollen counter located at TA-54.

Scope

This procedure applies to the ESH-17 personnel assigned to operate the Rotorod pollen counter located at TA-54.

In this procedure

This procedure addresses the following major topics:

Hazard Control Plan

The hazard evaluation associated with this work is documented in Attachment 1: Initial risk = **low**. Residual risk = **low**. Work permits required: **none**. First authorization review date is one year from group leader signature below; subsequent authorizations are on file in group office.

Signatures

Prepared by: _____ Alice Baumann, ESH-17	Date: 4/17/00
Approved by: _____ Jean Dewart, Environmental Measurements Project Leader	Date: 4/18/00
Approved by: _____ Terry Morgan, QA Officer	Date: 4/18/00
Work authorized by: _____ Doug Stavert, ESH-17 Group Leader	Date: 4/20/00

05/31/00

General information about this procedure

Attachments

This procedure has the following attachments:

Number	Attachment Title	No. of pages
1	Hazard Control Plan	2

History of revision

This table lists the revision history and effective dates of this procedure.

Revision	Date	Description Of Changes
0	4/21/00	New document.

Who requires training to this procedure?

The following personnel require training before implementing this procedure:

- Personnel changing sampling rods
- Personnel identifying and counting pollen

Annual retraining is required and will be by on-the-job training.

Training method

The training method for this procedure is **on-the-job** training and is documented in accordance with the procedure for training (ESH-17-024).

Prerequisites

In addition to training to this procedure, the following training is also required prior to performing this procedure:

For those removing and changing sample rods only (through step 6 on page 4)

- First Aid and Cardiopulmonary Resuscitation (CPR)

For those identifying and counting pollen (steps 7 through 14 on page 4)

- Course in pollen counting

References

The following documents are referenced in this procedure:

- ESH-17-024, “Personnel Training”

Note Actions specified within this procedure, unless preceded with “should” or “may,” are to be considered mandatory guidance (i.e., “shall”).

Pollen counting with the Rotorod pollen sampler

Description of Rotorod pollen sampler

The Rotorod sampler is a rotation-impaction device used to collect airborne pollen. Two polystyrene rods (1 ¼" long and 1/16" wide) are coated on one side with silicone grease. When the sampler operates, the rods swing out due to centrifugal force and are exposed to ambient air.

Frequency of pollen counts

A pollen count is normally performed thrice per week, but this may be changed at the discretion of the AIRNET project leader. At some times of the year, the pollen counting may be discontinued due to low pollen.

Standard conditions to obtain pollen count

Rotation speed: 2400 rpm
Sampling time: 24 hours (1440 minutes)
Sampling percentage: 10% (1 minute every 10 minutes)
Area of rod counted: entire rod under 1 cover slip
Volume of air sampled under standard conditons: one rod will sample 3.12 m^3 of air

Equation for pollen count

The standard equation to calculate a pollen count is:

$$N / V$$

Where:

N = number of pollen grains counted per rod over 24-hour sampling period;
V = volume of air sampled, in m^3 (normally $3.12m^3$)

Counting the grains on a rod refers to the area on the rod under one cover slip.

Changing the sampling time

If the sampling time varies from 1440 minutes, divide the new time (in minutes) by 1440 [24 hours = 1440 minutes] and multiply that number by 3.12 m^3 to get the new volume of air sampled.

Changing the area of the rod counted

The area of the rod counted may be decreased if the pollen counts are high. 400 grains are considered sufficient to obtain an accurate pollen count. If this approach is used, estimate the portion of the rod counted. For example, if 23% of the rod is counted, decrease the volume of air sampled to 23% of 3.12 m^3.

Pollen counting with the Rotorod pollen sampler, continued

Steps to collect a pollen sample

To collect a pollen sample, perform the following steps:

Step	Action
1	Mark 2 rods with a permanent marker on the proximal ends and on the sides of the rods to be exposed. The metal arm which retracts the rods is marked indicating the direction of rotation.
2	Grease two rods ***lightly*** with silicone grease.
3	Using forceps and grasping the rod on the non-greased sides, insert the rods into the rod holders in the metal arm and secure the rods with the thumb screws.
4	Ensure the thumb screw holding the metal arm to the sampler is tight.
5	Place the sampler on the extension pole at the sampling site and make the appropriate connections to the timer. Raise the pole to its maximum extension.
6	Flip the timer on and note the time.
7	Twenty-four hours later, lower the pole, remove the sampler, and remove the rods (with forceps).
8	Place the rods in the grooved stage adapter with the greased side up.
9	Apply Calberla's stain and place the cover slip on the rod.
10	Allow stain to uptake for 5 minutes.
11	Using the binocular microscope, count and identify pollen grains at 400x.
12	Note the number of grains by type. Record the counts on the pollen data sheet (supplied by MultiData, Inc.).
13	Consider any adjustments or corrections to the data, as described in the blocks above, and calculate the total pollen count according to the equation given above.
14	Enter the data in a spreadsheet and email it to the office of Allergy and Asthma Associates in Los Alamos, or other location as requested.

Calibrating the sampler

Get the sampler spin rate (2400 rpm) calibrated annually by Sampling Technologies. Contact Multidata at 612-285-9887.

Records resulting from this procedure

Records

The following records generated as a result of this procedure are to be submitted **annually** as records to the records coordinator:

- Calibration certification for the Rotorod

HAZARD CONTROL PLAN

1. The work to be performed is described in this procedure.
"Pollen Counting"

2. Describe potential hazards associated with the work (use continuation page if needed).

Lightning
Tripping
Snakes
Cuts from handling instrument and slides
Electrical shock in wet conditions
Electrical shock from damaged electrical cord

3. For each hazard, list the likelihood and severity, and the resulting initial risk level (before any work controls are applied, as determined according to LIR300-00-01.0, section 7.2)

Lightning - catastrophic/remote = low
Tripping - moderate/remote = minimal
Snakes - critical/remote = minimal
Cuts from handling rotorods and slides - negligible/remote = minimal
Electrical shock in wet conditions - catastrophic/remote = low
Electrical shock from damaged electrical cord - catastrophic/remote = low

Overall *initial* risk: ☐ Minimal ☒ Low ☐ Medium ☐ High

4. Applicable Laboratory, facility, or activity operational requirements directly related to the work:
☐ None ☒ List: Work Permits required? ☒ No ☐ List:

LIR 402-600-01.0 "Electrical Safety" for all electrical hazards

HAZARD CONTROL PLAN, continued

5. Describe how the hazards listed above will be mitigated (e.g., safety equipment, administrative controls, etc.):

Lightning - New Employee Orientation includes training and awareness concerning lightning safety
Tripping - New Employee Orientation includes training and awareness
Snakes - New Employee Orientation includes training and awareness
Cuts from handling rotorods and slides - use common sense
Electrical shock in wet conditions - install a permanent conduit for the electrical hook-up, shut off power to station prior to changing sample
Electrical shock from damaged electrical cord - place an electrical aluminum cover over the electrical cord to prevent vehicles from damaging the cord

6. Knowledge, skills, abilities, and training necessary to safely perform this work (check one or both):
   - ☒ Group-level orientation (per ESH-17-032) and training to this procedure.
   - ☒ Other → See training prerequisites on procedure page 2. Any additional describe here:

7. Any wastes and/or residual materials? (check one) ☒ None ☐ List:

8. Considering the administrative and engineering controls to be used, the *residual* risk level (as determined according to LIR300-00-01.0, section 7.3.3) is (check one):
   ☐ Minimal ☒ Low ☐ Medium (requires approval by Division Director)

9. Emergency actions to take in event of control failures or abnormal operation (check one):
   ☐ None ☒ List:

For all trips, falls, burns, cuts, electrical shocks and animal related injuries, provide first aid and see that injured person is taken to ESH-2 or the hospital. For any exposed, energized electrical wires, contact JCNNM or the appropriate authority to turn off the power.

Signature of preparer of this HCP: This HCP was prepared by a knowledgeable individual and reviewed in accordance with requirements in LIR 300-00-01 and LIR 300-00-02.

_____	_____	_____
Preparer(s) signature(s)	Name(s) (print) /Position	Date

Signature by group leader on procedure title page signifies authorization to perform work for personnel properly trained to this procedure. This authorization will be renewed annually and documented in ESH-17 records. Controlled copies are considered authorized. Work will be performed to controlled copies only. This plan and procedure will be revised according to ESH-17-022 and distributed according to ESH-17-030.